



User Recommendations for RF-Safe Green Det™

2-300750-1

MAN-DET-RF (R05)

*Please check Owen website at
www.corelab.com/owen/ to confirm latest revision of User Manual*

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Warning: Explosives are destructive by nature! Do not attempt to disassemble or alter the detonator in any manner! Do not crush, hammer, pinch, impact, pull wires or abuse the detonator or any explosive!



Warning: Be sure to follow safe operating practices as found in API RP-67 in accordance with governmental regulations, company policies and manufacturer's recommendations!

Owen Oil Tool's and Pacific Scientific's RF-Safe Reactive Semi-Conductor Bridge (RSCB) Detonators are designed to detonate a lead free energetic material when an electrical voltage typically between 130 VDC and 180 VDC is applied. This allows the detonator to be fired with any standard 300V / 2A firing panel in wireline operations. The RF-Safe RSCB Detonator is manufactured to API RP-67 recommendations and has been tested and verified by Franklin Applied Physics to withstand up to 10 GHz frequency at 100 V/m field strength. This detonator will withstand temperatures of -40°F to 400°F for 12 hours while still maintaining a 99.99% initiation reliability @ 95% confidence. For more technical information regarding this detonator, please refer to Owen Oil Tool's "Technical Specifications" sheet (Owen Document #2-300750-1-DS)

Green Det™ with Crimp Sleeve Accessory (DET-0010-074)



When used with the green "crimp sleeve" accessory (P/N DET-0010-074), the Green Det™ is designed to be used in hollow steel carrier or scalloped gun systems where a fluid disabled detonator will prevent the detonation of a flooded gun when used properly. Fluid migrating through the fluid holes in the body of the crimp sleeve will prevent the detonator from initiating the detonating cord. The detonator and crimp sleeve accessory is designed to be used with the following detonating cords:

• 80gr./ft. PETN*	*Not fluid disabled or interruptible w/PETN detonating cord.
• 80gr./ft. HMX	• 40gr./ft. HMX LS
• 80gr./ft. HMX LS	• 40gr./ft. HMX LS Ribbon
• 80gr./ft. RDX	• 40gr./ft. RDX LS
• 80gr./ft. RDX LS	• 40gr./ft. RDX LS Ribbon



Note: Detcord adapters must be used with 40 gr./ft. Ribbon detonating cord. Sold separately and packaged individually by Owen Oil Tools. P/N DET-0010-006.



Note: Crimp sleeves sold separately and packaged individually by Owen Oil Tools. P/N DET-0010-074

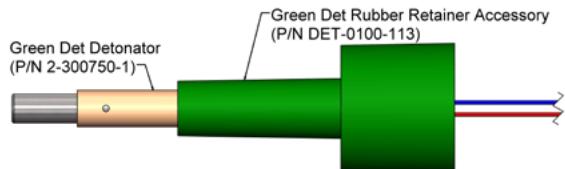


Caution: Owen Super Crimpers are designed to consistently create the proper crimping configuration! Use of any other crimping device could result in a misfire, caused by an inadequate crimp or damaging the detonator!

When used with the Crimp Sleeve accessory, the Green Det™ can also be interruptible. Please refer to [Section 3.0](#) for more details.

The user should satisfy themselves, as to the suitability of this product for the user's application. Please refer to the Owen Oil Tool's "Technical Specifications" sheet (Owen Document # DET-0010-074-DS) for more information.

Green Det™ for Pipe Recovery Applications



*Detonator and Rubber Retainer Accessory sold separately or as complete assembly under Owen P/N DET-3050-409.



The Green Det™ is compatible with all Owen's Split Shot® and Cutter (ACE, NT Segmented, etc.) products. For Owen Cutter products, the rubber retainer accessory (P/N DET-0100-113) must be used in order for the detonator to be properly installed into the cutter hardware. Please Section 2.0 for general installation and arming procedures using the Green Det™.



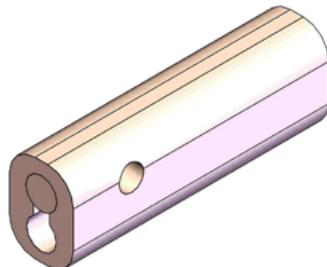
Note: Please refer to the Owen User Manual specific to the pipe recovery system being used. This manual will contain more specific information and instructions regarding the pipe recovery system being used.



Caution: Do NOT crimp directly onto the Green Det™! The detonator is not designed to be directly crimped and will damage the detonator if performed!

The user should satisfy themselves, as to the suitability of this product for the user's application. Please refer to Owen Oil Tool's "Technical Specifications" sheet (Owen Document # DET-3050-409-DS) for more information.

Green Det™ with Side Block Accessory (DET-3050-400)



When used with Owen's Green Det™ Side Block accessory (P/N DET-3050-400), the Green Det™ can be used in hollow steel carrier or scalloped gun systems where a fluid disabled design will prevent the detonation of a flooded gun when used properly. Fluid migrating through the fluid holes in the body of the block will prevent the initiation of detonating cord. The Green Det™ Side Block with detonator installed will fit into all of Owen's angled port subs 2.75" or larger. Fits into straight port subs may vary due to sub design so please consult your local Owen representative for details. The detonator and side block accessory is designed to be used with the following detonating cord types:

- 80 gr/ft. PETN* *Not fluid disabled w/PETN detonating cord.
- 80 gr/ft. HMX
- 80 gr/ft. HMX LS Not designed for use with ribbon type cord!
- 80 gr/ft. HMX LS XHV
- 80 gr/ft. RDX
- 80 gr/ft. RDX LS
- 80 gr/ft. RDX LS XHV

The Green Det™ Side Block accessory utilizes a small HMX booster inside the block for added initiation reliability of detonating cord in the parallel side configuration. This block design is rated for 400°F for 1 hour, and regulatory shipping and storage methods must be applied with the Green Det™ Side Block.



Warning: *The Green Det™ Side Block is an explosive device and should be handled with care! The block assembly contains an HMX explosive booster! Local and federal regulatory shipping and storage methods must be applied! Block assemblies should be stored in an environmentally controlled magazine when not being used!*



Note: *Green Det™ Side Blocks sold separately and packaged individually by Owen Oil Tools. P/N DET-3050-400.*

The user should satisfy themselves, as to the suitability of this product for the user's application. Please refer to the Owen Oil Tool's "Technical Specifications" sheet (Owen Document # DET-3050-400-DS) for more information.



Video: *Video requires the latest flash player to view. Download it here: <https://www.adobe.com/support/flashplayer/downloads.html>*



1.0 Procedures for Panel Setup and Firing Green Det™

1.1 Prior to arming or gun make up:

- Measure the voltage output from the panel with a digital blasters multi-meter at the cablehead, CCL, or Quick-Change. Verify a minimum of 300V DC output can be applied from the panel to the meter.



Note: *Mark the location of the needle on the voltage meter panel when 300V DC is applied to the multi-meter. This location will indicate that you are applying 300V DC to the gun string.*

1.2 Reset panel to safe mode.

1.3 Continue proper assembly of toolstring.

1.4 When ready to fire the gun or detonator downhole, increase the power to the firing circuit from 0V DC to the marked needle location that corresponds to 300V DC. The detonator will typically fire between 130 and 180 V DC. When down hole temperatures are near 400F, the detonator will typically fire between 100 and 120 V DC.



Note: *The user will not see any current being applied to the detonator when ramping up on the rheostat dial. However, the voltage should continue to ramp up until the 300 V DC level is reached.*

2.0 Arming



Warning: *Detonators should only be removed from their storage and individual packaging in the loading/arming area at the time of arming! Always insert the detonator inside an Owen Detonator Safety Tube (Part # DET-2000-000) after removal from packaging and storage!*

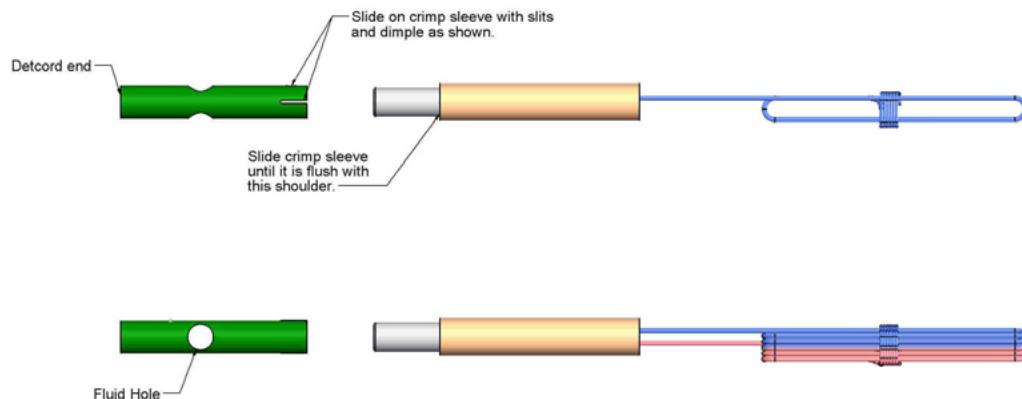


Note: *An electrical check of the detonator's firing circuit may be conducted while the detonator is confined within a safety tube. Using electrical blasters multi-meter with alligator clip leads, the RF-Safe Green Det™ will measure between 0.800 MΩ to 1.100 MΩ*

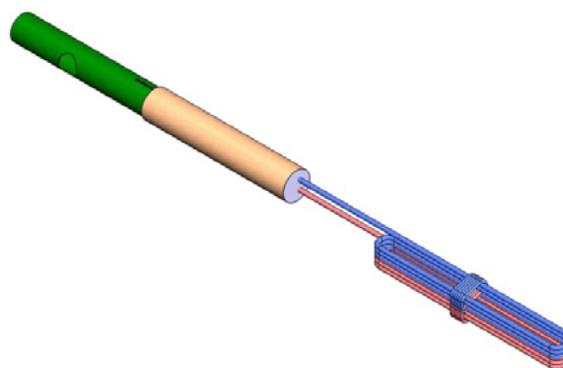
2.1 Green Det™ with Crimp Sleeve Accessory

2.1.1 Remove both the Green Det™ (P/N 2-300750-1) and green, stainless steel crimp sleeve (P/N DET-0010-074) from their packaging. Keep the detonator shunted during handling.

2.1.2 Slide the green, stainless steel crimp sleeve onto the output end of the detonator making sure to slide the end with the slits onto the detonator. The figure below shows an example.



Make sure the crimp sleeve sits flush with the shoulder of the detonator. The crimp sleeve should be snug on the detonator. The finished product should look like this:

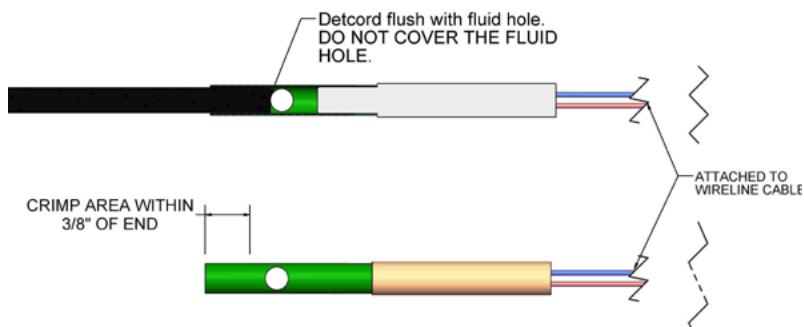


2.1.3 Insert the detonator into a detonator safety tube (P/N DET-2000-000) and secure the lid shut. The resistance may be checked at this time.

2.1.4 Make sure panel is safe, key is removed and outside the unit, and verify no voltage is measured on the wireline.

2.1.5 With the detonator still in the safety tube, electrically connect the detonator to the wireline cable by attaching the **red wire to hot lead and the blue wire to ground**. The detonator is now electrically armed, and it may now be removed from the safety tube.

2.1.6 Carefully make a square, clean cut of the detonating cord using the Owen Super Cutters (P/N DET-0000-036). Insert the newly cut end of the detonating cord into the open end of the crimp sleeve until it becomes flush with the fluid hole (see figure below). If using 40 gr/ft Ribbon detcord, then use Owen's detcord adapter (P/N DET-0010-006). The fluid hole should not be filled or covered by explosive powder, detonating cord, tape, etc. as this could prevent the detonator from being fluid disabled. Crimp the cord in place in a 3/8 in. (0.95cm) area from the end of the crimp sleeve using Owen Super Crimpers (P/N DET-0100-053). The detonator is now ballistically armed, and the finished product should look something like the figure below:



2.1.7 Complete the mechanical assembly of the device and tool assembly taking care not to force, pinch, crush, or impact the explosive components or wiring. Be sure the green crimp sleeve is still attached properly and flush with the end of the detonator.

2.2 Green Det™ with Side Block Accessory

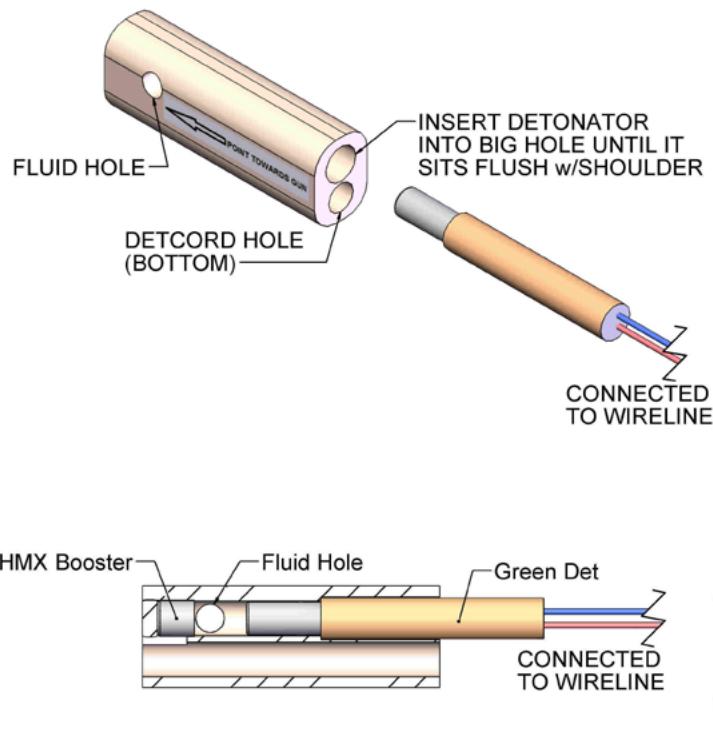
2.2.1 Remove both the Green Det™ (P/N 2-300750-1) and Green Det™ Side Block (P/N DET-3050-400) from their individual packaging. Keep the detonator shunted during handling.

2.2.2 Insert the detonator into a detonator safety tube (P/N DET-2000-000) and secure the lid shut. The resistance may be checked at this time.

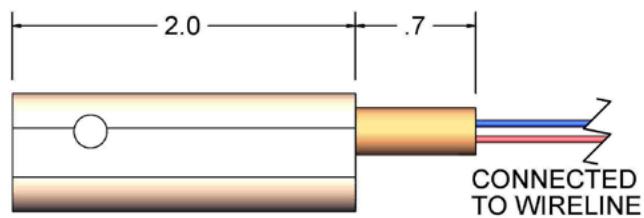
2.2.3 Make sure the panel is safe, key is removed and outside the unit, and verify no voltage is measured on the wireline.

2.2.4 With the detonator still in the safety tube, electrically connect the detonator to the wireline cable by attaching the **red wire to hot lead and blue wire to ground**. The detonator is now electrically armed, and it may now be removed from the safety tube.

2.2.5 Slide the detonator into the Green Det™ Side Block by inserting the output end first until the detonator “bottoms out” inside the block. There should be roughly 0.7” of the detonator still sticking out of the block. The user may wish to tape the detonator in place, if desired. The figures below show an example of the assembly.

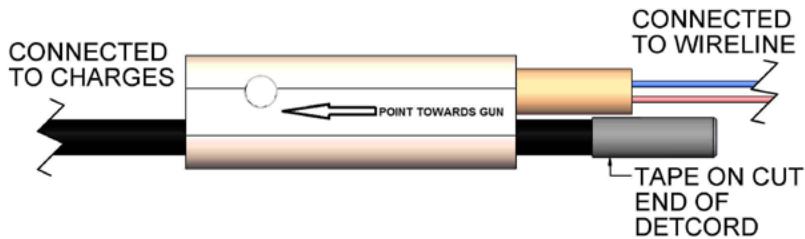


The finished product should look something like this:



2.2.6 Carefully make a square, clean cut of the detonating cord using the Owen Super Cutters (P/N DET-0000-036), and install the detonator block assembly onto the detonating cord by feeding the cut end of the detonating cord towards the detonator from the opposite side (see figure below). The remaining length of detonating cord attached to the gun charges should be on the side opposite from the detonator lead wires.

2.2.7 Once the detonating cord is feed through the block, cover the cut end of detonating cord with tape prior to assembly into the port sub. This will prevent the detonating cord from sliding back through the block. Ensure that the fluid hole is not filled or covered by explosive powder, detonating cord, tape, etc. as this could prevent the detonator from being fluid disabled. The detonator is now ballistically armed, and the finished product should look something like the figure below:



2.2.8 Complete the mechanical assembly of the device and tool assembly taking care not to force, pinch, crush, or impact the explosive components or wiring. Be sure the block is still attached properly.

2.3 Green Det™ for Owen Split Shot®

2.3.1 Remove the Green Det™ from its packaging. Keep the detonator shunted during handling.

2.3.2 Insert the detonator into a detonator safety tube (P/N DET-2000-000) and secure the lid shut. The resistance may be checked at this time.

2.3.3 While keeping the detonator in the safety tube, insert the shunted wires of the detonator through the hole in the top sub.

2.3.4 Make sure the firing panel is safe, key is removed and outside the unit, and verify that no voltage is measured on the wireline.

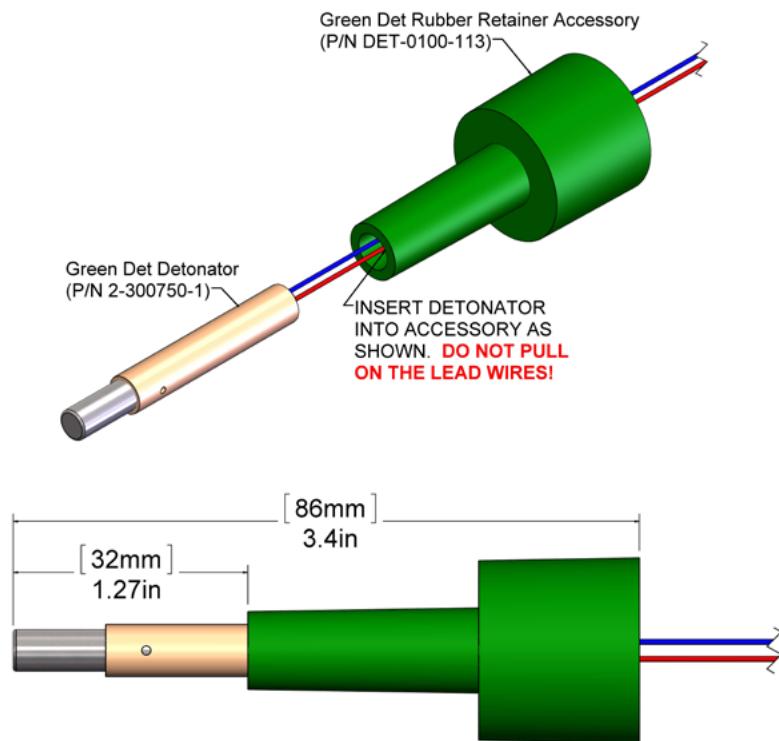
2.3.5 With the detonator still in the safety tube, electrically connect the detonator to the wireline cable by attaching the **red wire to hot lead and the blue wire to ground**. The detonator is now electrically armed, and it may now be removed from the safety tube.

2.3.6 For all remaining steps, please refer to the Owen User Manual specific to the Split Shot system being used. This will contain specific information to the Split Shot and how to complete the ballistic arming procedure.

2.4 Green Det™ with Rubber Retainer Accessory for Owen Cutters

2.4.1 Remove the Green Det™ Pipe Recovery assembly (P/N DET-3050-409) from its packaging. Keep the detonator shunted during handling.

2.4.1.1 If the rubber retainer accessory (P/N DET-0100-113) and Green Det™ detonator were ordered separately, then remove each individual item from their packaging and install the green rubber retainer onto the detonator as shown in the figure below. The detonator will “bottom out” on an internal shoulder inside the rubber accessory, and there should be roughly 1.27” of detonator length protruding from the part. Keep the detonator shunted during handling.



Warning: *Never pull on the detonator lead wires as this could damage the detonator or cause serious injury!*

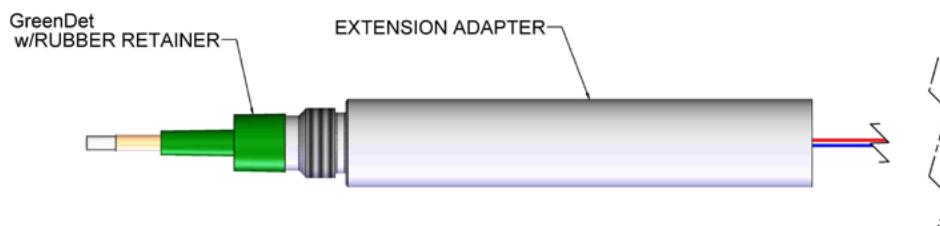
2.4.2 Insert the detonator into a detonator safety tube (P/N DET-2000-000) and secure the lid shut. The resistance may be checked at this time.

2.4.3 While keeping the detonator in the safety tube, insert the shunted wires of the detonator through the male end of the shock sub extension mandrel.

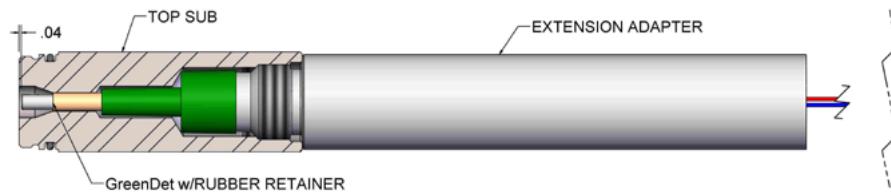
2.4.4 Make sure the firing panel is safe, key is removed and outside the unit, and verify that no voltage is measured on the wireline.

2.4.5 With the detonator still in the safety tube, electrically connect the detonator to the wireline cable by attaching the **red wire to hot lead and the blue wire to ground**. The detonator is now electrically armed, and it may now be removed from the safety tube.

2.4.6 With the detonator removed from the safety tube, install the booted portion of the detonator over the end of the extension adapter.



2.4.7 Insert the detonator, output end first, into the cutter top sub and thread the top sub onto the extension adapter. The detonator end should be roughly 0.040in. recessed from the bottom of the cutter top sub.



Note: Top Subs and Extension Adapters will vary. Please refer to the Owen User Manual specific to the cutter system being used for more details on hardware and procedures.

2.4.8 Make sure the top sub's o-ring is lightly lubricated with grease and thread the explosive cutter load/components onto the top sub being careful not to force, pinch, crush, or impact the explosive components. The ballistic arming is now complete.



Note: Please refer to Owen's Cutter User Manual specific to the cutter system being used. This manual will contain more specific information and instructions regarding the cutter assembly being used.

3.0 Ballistic Transfer Interrupter



Warning: *Owen's Ballistic Interrupter device is NOT compatible with any type of PETN based detonating cord! Due to PETN's sensitivity, it may still be able to pick up the shock from the detonator and initiate high order. In no circumstances should Owen's interrupt device be used and transported with PETN detonating cord. Please see compatible detonating cords in Section 3.1.*

3.1 Green Det™ with Crimp Sleeve Accessory

3.1.1 When used with the green crimp sleeve, this detonator can use an Owen Interrupter to prevent ballistic transfer from the detonator to the detonating cord. With the interrupter in place, the detonating cord will not detonate. (Please see warning above). This feature may aid in the transport of an armed gun system following all applicable local and federal regulations. Please note this transportation is for the United States only and it is at the discretion of each company whether they choose to use this option.

3.1.2 The following detonating cord types are compatible with the Green Det™ with Crimp Sleeve Accessory (P/N DET-0010-074) and Owen Interrupter (P/N INT-3050-125I):

- 80gr./ft. RDX LS
- 80gr./ft. RDX
- 80gr./ft. HMX LS
- 80gr./ft. HMX
- 40gr./ft. RDX LS
- 40gr./ft. RDX LS Ribbon
- 40gr./ft. HMX LS
- 40gr./ft. HMX LS Ribbon

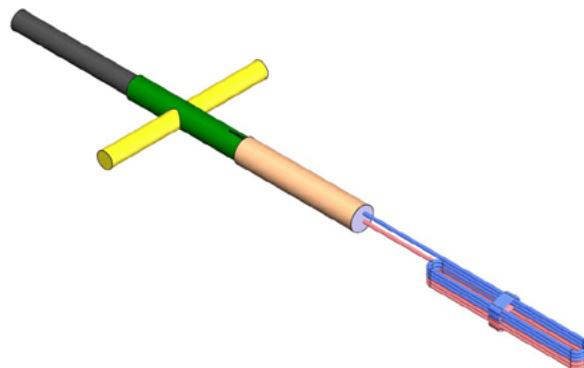


Note: *Detcord adapters must be used with 40 gr./ft. Ribbon detonating cord. Sold separately and packaged individually by Owen Oil Tools. P/N DET-0010-006.*



Warning: *Do NOT use any other type of interrupter device other than Owen's INT-3050-125I! Extensive testing has been performed by Owen Oil Tools to ensure reliability and confidence when using this specific interrupter part.*

3.1.3 To interrupt the ballistic transfer, the interrupter device must be purchased from Owen Oil Tools, part # INT-3050-125I. Place the interrupter into the detonator crimp sleeve's fluid hole making sure that it is fully inserted with part of the interrupter sticking out of both sides of the crimp sleeve. The interrupter will fit snugly. The below figure shows the interrupter in place. The interrupter can also be removed through a sub port.



4.0 Frequently Asked Questions

4.1 What amperage will these detonators fire at?

- The Green Det™ is not like Owen's typical resistorized detonators and no current amperage will be seen on the firing panel when energy is applied through the wireline. Instead, only the voltage dial will continue to rise. This is due to the spark gap design in the detonator that prevents the flow of current until enough energy builds up to "jump" that gap. At this point, an almost instantaneous rise of current is seen that travels across the spark gap, through the RSCB, and initiates the detonator. However, the current "jump" may happen too fast for most standard firing panels to record. Therefore, Owen recommends that voltage is continued to be applied up to the 300V "All-Fire Level" to ensure the most reliable initiation. Typically the detonator will fire around 130V - 180V. For elevated temperatures near 400F, this range may drop to 100V - 120V.

4.2 Does it matter which wire is attached to the positive or negative power source?

- For best results, Owen recommends that the red wire be attached to the positive source (hot lead) and the blue wire be attached to the negative (ground). However, the detonator can still fire if this is reversed but it is not recommended.

4.3 What resistance will the detonator measure?

- When the lead wires are attached to a Blaster's Ohm Meter, the Green Det™ will measure anywhere from $0.800\text{M}\Omega$ – $1.100\text{M}\Omega$. For best results, Owen recommends using alligator clips connected to the detonator lead wires. This will give the best connection and most accurate reading.

4.4 Do I need a PX-1 or special firing panel to use this detonator?

- No, a special firing panel or Fireset is not required with the Green Det™. This detonator will fire off a standard wireline power supply that has the capability to supply 300V & 1.5A.

4.5 Can I use this detonator with electronic addressable switches?

- Yes, the Green Det™ is compatible with most electronic addressable switches. Please consult your local Owen representative to receive more details before using the Green Det™ with the electronic addressable switch.